*Supporting Documentation for the Minimum Travel Time Module (IFT-FlamMap-MTT)

***Name of Software Tool**: Minimum travel time (IFT-FlamMap-MTT)

Current Version Description/Date: Version 1.5.0.10 (dll). November 22, 2010.

Software Code and History: The software code for the Minimum Travel Time module (.dll file format) was acquired from the USDA Forest Service's Rocky Mountain Research Station's OptFuels team in 2011.

***Software Developer(s) Names, Organization, and Contact Information**: USDA Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program.

> ***Note to Users: For questions specifically relating to the internal functional operations of this module, contact the developer(s) or help desk resources for this software tool. For questions regarding how this tool is used within IFTDSS, please contact the IFTDSS Team using the Feedback function available on every page of IFTDSS.**

***Science Model Contact, Names, Organization, and Contact Information:** USDA Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program; Mark Finney.

*Help desk contact information:

- o   Phone: 866-224-7677 or 360-326-6002
- o   Email: fire_help@fs.fed.us
- o   Website: http://www.fs.fed.us/fire/planning/nist

***Availability of the Version of Record**: The latest version of the software code for this surface fire behavior module resides with the USDA Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program.

***Primary Funding Sources**: Joint Fire Science Program (JFSP); U.S. Department of Interior Bureau of Land Management (BLM); USDA Forest Service, Rocky Mountain Research Station, Fire, Fuel, and Smoke Science Program; and USDA Forest Service, Rocky Mountain Research Station, Wildland Fire Research Development and Applications.

Application Purpose (General): The minimum travel time module (IFT-FlamMap-MTT) is a two-dimensional fire growth model. Fire growth and behavior are calculated by searching for pathways with minimum fire spread times from point, line, or polygon ignition sources. MTT calculates fire growth with all fuel moisture and weather conditions held constant over time.

The algorithm finds the minimum travel paths by calculating travel times among each node of the grid. Travel pathways are straight lines that intersect cells and connect nodes to form segments for which fire behavior is calculated based on the input data given by the user.

For more information, see http://www.firemodels.org/index.php/flammap-introduction/flammap-publications#Guides for Spatial Fire Behavior Analysis.

Application Purpose (Fuel Treatment): Fire growth is used in IFTDSS to help determine the growth rate of a particular fire ignition. The information provided by the module indicates how quickly a fire can be expected to move across the landscape, the intensity of the fire as it moves across the landscape, and the potential flame lengths as the area burns. When treatments are placed across the landscape, IFT-FlamMap-MTT can be run before the treatment is simulated, and then again after the treatment simulation, to investigate whether the desired reductions in flame length, fire intensity, or rate of spread are achieved.

*User/Application Documentation:

- *http://www.firemodels.org/index.php/national-systems/flammap

- *http://www.firemodels.org/index.php/flammap-introduction/flammap-publications

*User Application Guidance: Can be found at http://www.firemodels.org/index.php/flammap-introduction.

- *Finney, Mark A. 2006. An overview of FlamMap fire modeling capabilities. In Andrews, Patricia L.; Butler, Bret W.; comps. Fuels Management – How to measure success: Conference Proceedings. 28-30 March 2006; Portland, OR. Proceedings RMRS-P-41, Ft. Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, pp. 213-220. (http://www.fs.fed.us/rm/pubs/rmrs_p041/rmrs_p041_213_220.pdf)

*Scientific Foundations of the Software Tool:

- *Degree of validation/evaluation and availability of written results:

  o No information available at this time.

- Publication history:

  - Peer-reviewed publications

    o Ager, A. A.; Finney, M. A.; Kems, B. K.; Maffei, H. 2007. Modeling wildfire risk to northern spotted owl (*Strix occidentalis caurina*) habitat in Central Oregon, USA. Forest Ecology and Management 246: 45-56.

    o Finney, M. A. 2002. Fire growth using minimum travel time methods. *Canadian Journal of Forestry Research* 32: 1420-1424.

    o Finney, M. A. 2007. A computational method for optimising fuel treatment locations. *International Journal of Wildland Fire* 16: 702-711.

- o Stratton, R. D. 2004. Assessing the effectiveness of landscape fuel treatments on fire growth and behavior. *Journal of Forestry* 102(7): 32-40. (http://www.landsinfo.org/ecosystem_defense/federal_agencies/forest_service/Region_1/Idaho_Panhandle_NF/Bonners_Ferry_District/Myrtle%20HFRA/Myrtle%20Creek%20HFRA%20Objection%20references%20disk%204/stratton2004treatments.pdf)

*Training Availability: Can be found at http://www.firemodels.org/index.php/flammap-support/flammap-training.